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Soybean Seed: Testing for Quality

T. J. Gutormson

South Dakota State University

R. G. Hall

South Dakota State University

J. W. Schneider

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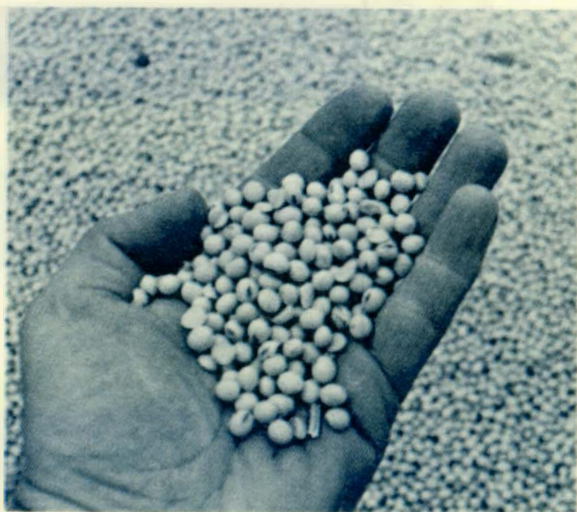
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SOYBEAN SEED:

Testing for Quality



Agricultural Experiment Station
South Dakota State University
U.S. Department of Agriculture

SOYBEAN SEED:

Testing for Quality

T.J. Gutormson,
Director, SDSU Seed Laboratory
R.G. Hall, Extension agronomist
J.W. Schneider, research assistant

Round, smooth, yellow soybean seeds usually provide better germination and field emergence than greenish, wrinkled, smaller seeds, but visual appearance can be misleading. All soybean seed lots should be tested for quality before planting.

The two tests currently available at SDSU are the standard germination (SG) test and the accelerated aging germination (AA) test, which is a stress test.

Standard germination test

The standard germination test (or warm test) measures soybean **germination** under **ideal** sprouting and development conditions.

Four samples of 100 seeds are placed on moistened blotters for 7 days at 77 F. Then the seedlings are counted and classified as normal, abnormal, dead, or hard (dormant).

Normal seedlings have all the essential structures to produce a plant. Abnormal seedlings are missing one or more of the essential structures or are decayed by microbes. Dead seeds show no growth and are decayed. Hard seeds show no growth and have not absorbed moisture because of impervious seed coats. Hard seeds, however, are considered viable and have the potential to germinate,

usually within 10 days of planting under field conditions.

The SG percentage is required by state and federal laws for seed labeled for sale. Germination percentages and their relation to seed value for planting are illustrated in Table 1.

Soybean seed lots with an SG test below 80% are not recommended for planting.

Table 1. Soybean seed standard germination and relative planting value.

90-99% Germination	Excellent
80-89% Germination	Good
Below 80% Germination	Poor

Accelerated aging germination test

The accelerated aging (or stress germination) test estimates the potential **emergence** of a soybean

seed lot under **less than ideal** field conditions.

Stress germination has proved to be more closely correlated to actual field emergence (Fig 1). Average seedling emergence obtained from the AA germination test gave a better indication of true early and late field emergence than did the SG test.

During the AA test, soybean seeds are exposed to a temperature of 105 F and 95% relative humidity for 72 hours before placing on blotters according to SG procedures. The test thus requires 10 days to complete, compared to 7 days for the SG test. The difference between the germination percentages of the AA and SG tests is used to rate the quality of a seed lot (Table 2).

Seed lots with similar results from both tests are generally the best seed, providing the original percentages are high.

Fig 1. Comparison of soybean seedling percentages obtained from laboratory germination tests with field emergence at two planting dates. Percentages were averaged over 3 locations, 12 seed lots, and 10 varieties.

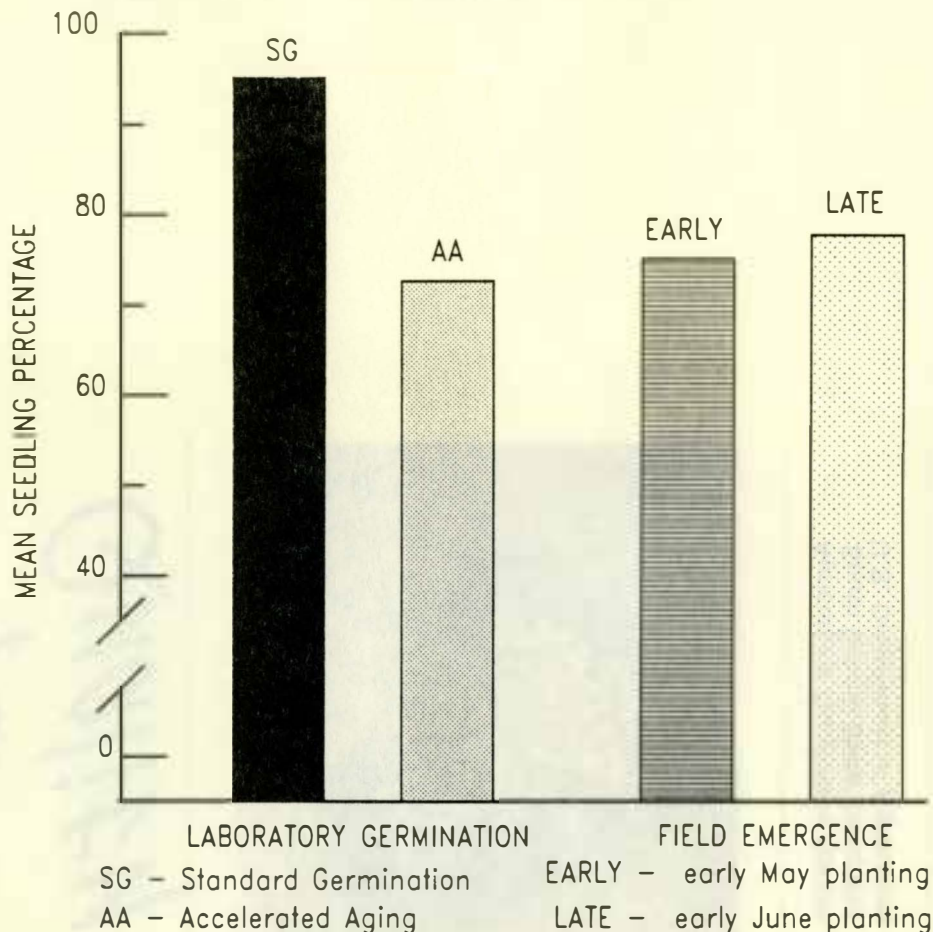


Table 2. Difference between SG and AA germination percentages and relative seed quality.

Difference	Seed quality
0-15%	Good
15-30%	Medium
30% and above	Weak

The average difference between AA and SG germination tests conducted at SDSU over the past several years has been from 10 to 15% (1985-1987 Seed Laboratory data).

Most carryover seed lots (seed grown two seasons prior to planting) usually have a difference exceeding 30%. Soybean seed lots with AA germinations below 70% are of questionable quality for planting.

A seed lot having an SG of 90% and an AA germination of 70% will usually result in 70% of the seeds producing vigorous seedlings.

Another 20% of the seeds may produce seedlings under ideal conditions, but may not emerge if stressed.

Under average field conditions, actual field emergence percentage will be between the percentage for the AA and the SG tests. However, if field conditions are stressful (cold soils, wet soils, hard crust, etc.) field emergence will be closer to the AA test.

Only seed with a good AA germination should be sold for seed because of the potential of a law suit due to poor stand establishment. The AA germination is not required for labeling by state and federal laws and is usually not listed on the seed tag.

For personal use, you should evaluate seed quality on the basis of the amount of risk you are willing to take, adjusting planting rate if necessary. Remember that emergence under field stress will

be more closely associated with the AA test.

Soybean seed samples for testing may be sent to: SDSU Seed Testing Laboratory, P.O. Box 2207A, SDSU, Brookings, SD 57007-1096. One quart of seed is needed to conduct both tests. Send seed samples packed in a cardboard box to reduce possible damage in shipping and handling.

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